An

Inaugural Essay

on

Hydrocephalus Acutus;

by

James Dickinson

of Maryland.

Passed March 1825

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Remarks on Hydrocephalus Acutus; or, as it is sometimes called Hydrops Capitis.

As formerly contemplated hydrocephalus was looked upon as disease whose designating feature was supposed to be, the existence of a watery fluid within the ventricles of the brain, between its membranes, or both; and as this condition of the brain was frequently found on post mortem examination, we are lead to the conclusion, that this appearance suggested the name. But from researches which subsequently have been carried into effect, it appears established from indubitable authority, that every symptom characterising the disease has been present when upon dissection no effusion had ensued; and now by those who have written with ability on the disease, it is acknowledged, that such a state of things is not necessary to constitute the disease under investigation. Therefore, it is plain, that the name (hydrocephalus) is an improper one, as merely pointing out the effect of a

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pre-existing & more characteristic state of the disorder, & one, too, that does not invariably follow. The propriety of it has been called in question, & in its stead, others have been proposed, which, though founded on more enlightened views, still are objectionable, because they do not seem to be based upon the firm & solid ground of the true pathology of the disease.

With improved views of the disease, the enlightened Cullen assigned it, in his Synopsis nosologiæ methodicæ, the title Apoplexia Hydrocephalica; & the late Dr. Rush with a truly original mind, conceived it to be a diminution of Phrenitis, & proposed to call it Phrenicula, as more expressive of its nature — a title which has been adopted by subsequent writers, with a few exceptions, & which is now employed at Edinburgh. As, however, the old name may seem to have a claim to existence from the length of time it has received the sanction of writers, we shall, in conjunction with Whytt & Fothergill, call "this disease the hydrocephalus internus or dropsy of the ventricles of the

~~ventricles of the~~ brain, till some more apposite names can be given to it."*

In our remarks on this disease we shall restrict ourselves to the hydrocephalus acutus; & shall observe the order of its history, etiology, symptomatology, pathology, & therapeia; each of which we design to notice distinctly.

History. Originally, the seat of effusion gave rise to the division of the disease into the two species, hydrocephalus internus & hydrocephalus externus; though late writers, from improved views of it, have, according to the phenomena exhibited, and the rapidity of its progress, divided it into the acute & chronic forms. †

To prove the existence of each species of the first division much ancient authority could be adduced. Even as far back as the time of Galen, &, perhaps, of Hippocrates, one species, at least, of the disease was observed; & Celsus, a Roman writer, mentions as having existed among the Greeks, a disease by this name. But to Hieronymus Mercurialis, a writer of the sixteenth century, is conceded the first mention of the existence of water in the ventricles of the brain. It has

* Medical Observations & Inquiries.

† This disease, Dr. Gölis has divided into the 3 forms, of hyperacute, acute & chronic. The first he calls "Water Stroke" & is incurable lethal.

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According to Van Swieten the hydrocephalus was, of old, considered to exist only when there was a preternatural enlargement of the head, and was regarded as certainly fatal, as Boerhaave, in his aphorisms, expressly declares.

The period of life at which this disease makes its attack is said to be that of early years almost exclusively, being rarely known to happen after the fifteenth year, & that it occurs more frequently at the period between the dentitions than at any other.

Dr. Cheyne mentions hydrocephalus & Scrophula as being convertible diseases; that he has seen all the symptoms of the former exchanged for those of the latter. Respecting hydrocephalus it appears somewhat strange, that the most robust, lively & active children should be equally liable to it as those of an opposite character. It has been said that it shows itself oftener during infancy than at a more advanced age; though, by Fothergill, it is affirmed, that he seldom saw it under the third year; but more frequently between the fifth & tenth year.

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He also met with it at a much later period of life; & many cases are recited by Dr. Quin, of Dublin, in which the disease appeared in grown persons. It is very probable that this disease does occur much oftener than is generally imagined, & that many cases appear, which undoubtedly would terminate in it, but are repelled by the timeous interposition of the appropriate medicines.

Etiology, or the account of the causes of hydrocephalus, we shall consider under the two heads of direct and indirect; the first producing Idiopathic; the second Symptomatic, Vascular disease. The last most frequently is the case.

Youth seems to be the predisposing period to it. It is said to run in families, & to affect those of peculiar constitutions. Dissections conducted by Lennec appear to throw considerable light on this subject.

Among the exciting causes of the direct kind may be mentioned, mechanical injuries; violent mental emotions; great agitation of the body; & whatever cause producing great disturbance in the vascular system. A frequent cause

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especially among the poor, is the frequent fits of crying to which their children are unavoidably exposed.

But the disease in most cases is symptomatic, produced by causes acting on the primæ viæ; & at the present day it appears to be the generally received opinion, that a majority of the cephalic affections have their primary origin in a morbid condition of the first passages.

So much do the premonitory symptoms of this disease tend to show, that the chylopoietic organs & chiefly the liver, are, in most cases, disordered anterior to the actual induction of the disease, that many noted practitioners consider it as always consecutive in its appearance. To this end it will suffice to mention the names of Yeats, of Wilson & Currie. The last gentleman, 'tis true, carries his belief to a great degree of extravagance, locating, primarily, all cases of the disease, in irritation of the liver. Without going to the extent of Dr. Currie's opinion, we will, however, subscribe our belief in that view, which assigns chylopoietic derangement, in most instances, as the cause

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of hydrocephalus. Every symptom, in fact, marking the accession of the disease, has been removed by cathartic medicines; & it is well known, that the greatest irregularity in these organs occurs previous to the appearance of it in its full form. Dissections, as will appear hereafter, abundantly confirm this conclusion. They have revealed "the surface of the liver of a bright red colour, abounding in minute vessels, & sometimes intensively adhering to the peritoneum." also enlarged mesenteric glands*; & diseased alimentary canal.†

Besides chylopoietic derangement, the purely febrile affections are very liable to induce encephalic irritation. This assertion has been made by those who have written on this subject.

Symptomatology. The progress of an attack of hydrocephalus has, according to the sensibility of the patient, & "the peculiar condition of the circulation", been divided into three stages; but it should be recollected that these are not always distinctly marked. The first stage is denoted by an increase

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of sensibility; the second, by an opposite condition, or increase of sensibility; and third, by a convulsive or paralytic state. By a late writer (Golis) a review of whose work may be found in the London Medico-Chirurgical Journal, this disease has been considered under the four heads, of turgescence, inflammation, effusion, & paralysis. From his ample opportunities of contracting an intimacy with the affection, & from his exposition of it, his views of it are strongly confirmatory of other opinions. In collecting & arranging the symptoms of this disease, much difficulty is experienced, which is acknowledged on all hands — the disease being in fact, perfectly "protiform" & frequently appears under the guise of other affections. As exhibiting, perhaps, more clearly, more accurately, & with greater simplicity, than any other, the most common approach, advancement, & decline of the disease, we beg leave to introduce the description of Dr. Quin, & afterwards to append some of the anomalies of it.

"In general, the patient is at first languid and inactive, often drowsy & peevish, but at intervals

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cheerful, & apparently free from complaint. The appetite is weak, a nausea, &, in many cases, a vomiting, occurs once or twice a day, & the skin is observed to be hot & dry, towards the evenings; soon after these symptoms have appeared, the patient is affected with a sharp headache chiefly in the fore part, or, if not there, generally in the crown of the head: it is sometimes, however, confined to one side of the head, &, in that case, when the posture of the body is erect, the head is often inclines to the side affected. We frequently find, also, that the headache alternates with the affection of the stomach; the vomiting being less frequent when the pain is most violent, & vice versa; the other parts of the body are likewise subject to temporary attacks of pain, viz: the extremities, or the bowels, but more constantly the back of the neck, & between the scapulæ; in all such cases the head is more free from uneasiness.

The patient dislikes the light at this period; cries much, sleeps little, & when he does sleep he grinds his teeth, picks his nose, appears to be uneasy, & starts often, screaming as if he were terrified; the bowels are, in most cases, very much confined, though it sometimes happens that they are in an opposite state; the pulse, in the early stage of

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the disorder, does not usually indicate any material derangement."

"When the symptoms above-mentioned have continued for a few days, subject as they are always, in this disease, to great fluctuation, the axis of one eye is generally found to be turned in towards the nose; the pupil, on this side, is rather more dilated than on the other; & when both have the axes directed inwards (which sometimes happens), both pupils are larger than they are observed to be in the eyes of healthy persons; vomiting becomes more constant, & the headache more excruciating; every symptom of fever then makes its appearance, the pulse is frequent, & the breathing quick; exacerbations of the fever take place towards evening, & the face is occasionally flushed: usually one cheek is much more affected than the other; temporary perspirations likewise break forth, which are not followed by any alleviation of distress; a discharge of blood from the nose, which sometimes appears about this period, is equally inefficacious."

"Delirium, & that of the most violent kind, particularly if the patient has arrived at the age of puberty, now takes place, &, with all the preceding symptoms of fever, continues for a while to increase, until about fourteen days, often a much shorter time, shall have elapsed since the appearance of the symptoms, which were first mentioned in the above detail."

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"The disease then undergoes that remarkable change, which sometimes suddenly points out the commencement of what has been called its second stage: the pulse becomes slow, but unequal, both as to its strength, & intervals between the pulsations; the pain of the head, or of whatever part had been previously affected, seems to abate, or at least the patient becomes apparently less sensible of it; the interrupted slumbers, or perpetual restlessness which prevailed during the earlier periods of the disorder, are now succeeded by an almost lethargic torpor, the strabismus, & dilatation of the pupil increase, the patient lies with one or both eyes half closed, which, when minutely examined, are often found to be completely insensible to light; the vomiting ceases; whatever food or medicine is offered is usually swallowed with apparent voracity; the bowels, at this period, generally remain obstinately costive."

"If every effort made by art fails to excite the sinking powers of life, the symptoms of what has been called the second stage are soon succeeded by others, which more certainly announce the approach of death. The pulse again becomes equal, but so weak & quick, that it is almost impossible to count it; a difficulty of breathing, nearly resembling the stertor apoplecticus, is often observed; (this last symptom is generally attributed to compression of the brain from effusion; but this point is now con=

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converted, & Mr. Burns observes, "Even in cases of effusion, or pressure, these symptoms (meaning such as appear in the last stage of hydrocephalus) proceed from the impaired function of the brain & nerves, consequent to pressure, & any other causes, capable of producing a similar diminution of function, will have precisely the same effect." Mr. Burns conceives, that the pressure is merely the exciting, & not the proximate cause of the symptoms.) sometimes the eyes are suffused with blood, the flushing of the face is more frequent than before, but of shorter duration, & followed by deadly paleness; red spots, or blotches, sometimes appear on the body & limbs; deglutition becomes difficult, & convulsions generally close the scene. In one case, I may observe, the jaws of a child of four years of age were so firmly locked, for more than a day before death, that it was impossible to introduce either food or medicine into his mouth; &, in another case, a hemiplegia, attended with some remarkable circumstances, occurred during the two days preceding dissolution." The sutures sometimes, if the patient be young, recede, & towards the last, the head is much increased in size.*

Although the greater number of the above symptoms may occur in most cases, yet, it must be confessed, that great irregularity

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is observable in them, & they are very equivocal. When hydrocephalus originates from disorder of the abdominal organs, it is, indeed, very illusive & obscure in its approach, assimilating itself to many disorders which occur at this period of life. So very like the affection occasioned by worms, is it that Fothergill, at first, considered & treated it, as that affection.

Among the most prominent precursory symptoms of the disease, may be remarked, the pallid countenance – dulness of the eye – capricious appetite – incrusted tongue – thirst – confined or irregular bowels, & the unnatural aspect of the fæces; the nature of which, in this disease, has been considered as differing from that in any other – being of a dark green colour, "sometimes as dark as tar", with an oily surface, & having a sickly but not fœtid smell.* Upon this condition of things, symptoms soon supervene, indicating the participation of the encephalon in the disease, & more or less rapidly are developed most of the designating symptoms of hydrocephalus already mentioned. More or less of the last mentioned signs most frequently precede those which may be considered pathognomonic, & hence the consecutive or secondary nature of its

* Cheyne.

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Pathology. We come next to inquire into the effects of what we have mentioned as causes of hydrocephalus, both direct & indirect. We now ask what is that condition of the cerebral system of vessels which constitutes the proximate cause (ipse morbus) of hydrocephalus; or whence arise the symptoms? Does it consist in inflammation of the bloodvessels of the brain, or meninges or both conjoined? Or, is it a peculiar & specific action of the bloodvessels of the brain, differing from Phrenitis, which is supposed to consist of meningeal inflammation? On this point there is much disputation; & we will just pass in review, what is now conceived to be the correct pathology of this affection.

It is well-known, perhaps, that Dr. Rush entertained the opinion of the identity of the two diseases, merely regarding them as different grades of the same peculiar action — the highest degree of phlogosis producing Phrenitis, while a less degree produced the diminutive disease called Phrenicula. Equally well-known it may be, that Cheyne, who has written with great ability on this subject, views the disease in a different light. He thus observes, "it ought to be recollected, that, in hydrocephalus, the centre of the brain is the

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part chiefly affected; at least, in most cases, we find the effusion on the surface of the brain bearing no proportion to that in the ventricles, & the cortical part of the brain sound, while the central parts are broken & disorganized; whereas the effects of phrenitis are more superficial being sometimes apparently confined to the membranes on the other side.* He conceives the disease to be a peculiar & distinctive action, of the nature of which we know as little as of the peculiarity which constitutes many other diseases; that it attacks the brain in nearly opposite conditions, as in infancy; whereas phrenitis appears in adult life; that it attacks children of dark complexions; whereas phrenitis affects grown persons of the sanguine or choleric temperament. But such nicety of discrimination may not be required on this head, as the indications & method of cure, are, in either contemplation of it, the same.

The similarity as well as the analogous nature of the symptoms which appear in this disease, to those occurring in other inflammatory conditions, as also the appearances on dissection, conducts us to the conclusion, that the disease is a specific & altered action of the vessels of the brain, terminating, sometimes, in an effusion of a limpid fluid.

* Cheyne's Works Vol. 2. – 73.

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By researches post-mortem have been perceived the engorgement of the vessels, & congestion of the sinuses of the dura mater. "The ventricles we find to contain from two to six ounces of limpid serum; also fluid, in a small quantity, under the tunica arachnoidea, both above & at the base of the brain. The substance of the brain is generally soft & blanched, fimbriated, & particularly soft where it forms the ventricles." In almost every instance, the most unequivocal marks of inflammation will be exhibited. To establish this point, cases recorded by C. W. Dewin, may be cited. The blood-vessels of the brain, in these instances, were so unusually distended, that the whole substance of it had the similitude of an injected preparation; & that no effusion whatever had ensued. More fully to establish the point, that effusion does not always ensue, we will quote the records of Dr. Rush on this subject. He thus observes, "I do not suppose that both inflammation & effusion always attend in this disease;" he then further says, "Neither do I suppose, that the two stages which have been mentioned always succeed each other in the common order of inflammation & effusion. In every case where the full tense-slow & intermitting pulse occurs, I believe there is inflammation, & as this state of the pulse occurs in

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most cases in the beginning of the disorder, I suppose the inflammation, in most cases, to precede the effusion of water." It would be easy to prove, frequently, the want of effusion in this disorder, & thereby the fallacy of the name.

Diagnosis. The pathognomonic signs of hydrocephalus, are, pretty constant pain in the head, vomiting, dilatation of the pupil of the eye, preternatural slowness of pulse, stupor and convulsions.

From the Infantile Remittent Fever, & that occasioned by worms, it is exceedingly difficult to distinguish it. From the first, hydrocephalus may be known by the intensity of its symptoms: & from the worm fever, it is distinguished thus; in worm fever, the exacerbations are attended by great drowsiness, & the remissions by a morbid vigilance. & in this two, there is sometimes a loss of voice.*

Prognosis. This, many times, is not difficult. The most unfavourable may be made when the above pathognomonic signs appear. But, if by the use of evacuating & vesicating remedies the symptoms be removed, & do not recur for 2 or 3 days, there is hope of recovery; if, however, during this time, there be a recurrence of irregular pulse, pain in the head & vomiting, between the 13th & 17th day or a little later, death ensues. T. Bysom, if during sleep, there be a "general steaming perspiration ~~[illegible]~~" & continue several hours, it is considered a good omen.

* Chapmans lectures.
† Gibson Undreckhakes

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Therapeia. To deny that any difficulty exists in this part of our subject as regards the probability of curing this disorder, would be to rebut the affirmation of much evidence. From the days of Boerhaave to the time Fothergill & subsequently, was this disease looked upon with horror, & associated with the apprehension of its inevitable fatality. The latter, in his observations on the subject, remarks, "at the same time, I must own to you, it is not in my power to suggest any probable means of curing the disease of which I treat; it has baffled all my attempts, both when confided in alone, & in consultation with the ablest of the Faculty!" This shows the unfavourable light in which the curability of the disease was then contemplated.
By others it is stated, that when recoveries do take place, more should be attributed to the operations of nature, than to the interference of art*. Its existence, even, has been questioned by some, in those cases, in which cures appear to have been effected.
In hydrocephalus the mode of proceeding must be somewhat modified according to the stages of the disease. The indication first to be answered, is the reduction of vascular action. For this purpose, as the most direct means, we must appeal to venesection, which, according to circumstances must be repeated, & carried to an extent sufficient to produce a determinate end — the prevention of effusion. The general system should be depleted, & locally, the head itself, by Cups & leeches; & as much should be

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extracted as seems to be required. Another class of medicines is universally of high repute in the cure of this disease. Originating, as it does, most frequently, from disorder of the intestinal passages, purgatives would seem to be the appropriate articles, & now, in the estimation of the ablest practitioners they hold the first rank. The bowels being usually confined it is required, at first, to empty them freely, & afterwards to establish a constant irritation, or "intestinal salivation", by which action, in other parts, is lessened & diverted. The cases recorded, as treated in this manner, are innumerable, & to prove its efficacy the evidence is abundant. I have heard it mentioned, that by the employment of articles of this kind, so active & irritating, as to produce bloody evacuations, not only benefit but actual cure has been attained.*

Calomel & its ordinary adjuncts, together with the more hydrogogue articles, such as elaterium, scammony, gamboge, colocynth, &, particularly, the croton oil, in all the cephalic affections, are usually resorted to. Cheyne approves highly of endeavouring to keep up a constant stimulation in the intestinal passages. He has recorded many cases of its utility, in his work on the subject. As local & very useful means in the treatment, are the removal of the hair, & the application of cold to the naked

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* Dr. Jackson, of this City.

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scalp. This after the reduction of excitement should be superseded by the application of a blister to the whole cranium. It has been advised that previous to the blister, the head should be shaved some 6 or 8 hours to prevent strangury, which is apt to follow. To the same end the washing the head thus prepared with laudanum is said to act as a preventive of strangury. When applied they should remain on four & twenty, or even thirty-six hours. Much may be gained by inducing suppuration of the scalp. Blisters may also be made to the back of the neck or between the shoulders. Dr. Clarke has suggested the propriety of their application to the legs "in a view to derivation from the head."

Mercury with another view is resorted to at a particular conjuncture of the disease. Much dispute, however, prevails as to its utility. Some consider it an invaluable medicine, while others regard it not so highly. It has been highly esteemed by Haggarth, Hunter, Dobson, Garnett, Carmichael & others. It is spoken of in very favourable terms by Professor Chapman, in his work on Therapeutics. He says that, "Even where suppuration has not taken place, it is serviceable by changing the action of the vessels, & diverting the complaint from the head."* Why it failed in the hands of Dr. Rush, & probably, of others, is plainly accounted for,

* Therapeutics article Mercury.

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we think, by himself, when he says "Perhaps my repeated failures in the use of this remedy, were occasioned by my giving it before the inflammatory action of the system was sufficiently subdued, by previous evacuations!"* That mercury, with a view to its alterant effect, when judiciously prescribed, at a suitable conjuncture of the disease, & under proper limitations, is serviceable, & promises much, is undeniable.

In beginning a mercurial course, nothing, says Dr. Cheyne, should occasion delay, but the employment of means to evacuate the bowels. During the course, if the region of the liver be full & tender, Cups, leeches & blisters should be applied. In the depraved state of the abdominal viscera, What would be the effect of the Nitro-Muriatic acid bath?

When opinion has ensued not less undecided are physicians as to the power of Mercury. Need it be said that even the curability of this disease, at this time, has been questioned? This idea is founded on the supposition of the non-existence of absorbents in the brain. But that they do exist is evident, from the phenomena of growth as well as their actual detection.

<u>Mercury</u>, however, by many, is considered as the only remedy deserving our confidence at this stage of the disease. To be effectual it must be employed with great boldness. Large doses of calomel on the stomach & bowels will

* Rush's Inquiries.

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bar, should be given internally, while the Ung. Hydrarg. is used by inunction. Flannel drawers smeared with the ointment should be worn; & socks, for the feet may be served in like manner. Nothing less is of any avail.
In the last stage of hydrocephalus, Bark, Wine & opium have also been used, & some say with advantage. The antiphlogistic plan should be, throughout, steadily adhered to; & whatever else, that may be demanded for particular symptoms.
Diuretics, particularly the digitalis*, have been used, on the authority of Percival; though the evidence is not in favour of it. Emetics, likewise, have been proposed upon the idea of their promoting absorption; but they, if at all, do it otherwise than by acting on that system of vessels. They have, however, according to Dr. Chapman done good, & have removed every symptom of the disease. †.
Electricity has been advised with the same intent as emetics, & may, possibly, be of service. An operation has likewise been resorted to; but this appertains more to the chronic species.
We have now finished our work, & are fully impressed with the belief of its imperfection; but it is the result of our first efforts & those feeble, from immaturity, & it is hoped, that it will be received with

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* combined with calomel & opium.
† Therapeutics Vol. 1.

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the same spirit in which it is offered—